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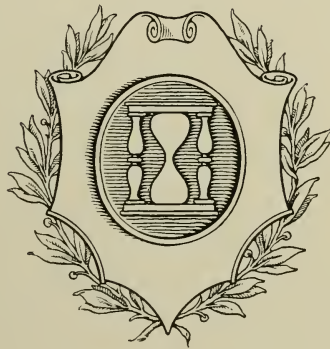
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WALTHAM

AND THE
EUROPEAN MADE WATCH



WALTHAM WATCH COMPANY
WALTHAM, MASSACHUSETTS

Copyright, 1919
Waltham Watch Company

THE content of this booklet is designed to give a more intimate understanding of what constitutes a "good" watch, by revealing some processes of its manufacture in relation to what it performs day by day in dependable service to its owner. Herein will also be found some valuable information that may be a protection in choosing a watch, and a guarantee of that satisfaction which is associated with accurate time-keeping.



DUANE H. CHURCH

The Inventor who put "America First"
into Waltham Watchmaking

WALTHAM

THE WORLD'S WATCH OVER TIME

AS Americans we are proud of our country. We believe that she exemplifies human achievement at its highest development; that, in the field of invention, in engineering, in mechanics, she leads the world. Has she not transposed the old into the new, and given substance and life to the dreams of men? There is no difficulty too great for her conquering mind and hand. And the watch is no exception.

To most men a watch is just a watch. They know little of its history and less of what has happened to it in improvement and development during the last half century. In fact, very few persons know the principles of its mechanism and what constitute the mechanical reasons for its daily miracle of time-keeping.

In a general way they know it must be wound up; that it has a mainspring and a hairspring, by some method related to a lot of wheels — and this conception they call the “works.” If anything goes wrong with this mysterious mechanism, they take it to a

watch doctor, and, with a certain amount of awe at his superior knowledge, await his verdict of "damage and cost."

There is no article used with so little knowledge of its composition, or bought with such blind faith, as the watch. No article more common, more universally used, and about which so little is known.

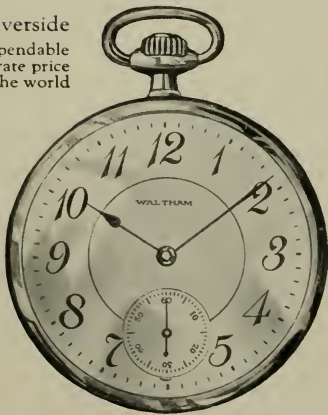
Yet we pride ourselves upon being the shrewdest buyers on earth, the most capricious in our likes and dislikes, the keenest to resent a "sharp deal," and in the case of every other product bought or sold we shop, compare, analyze and price. Truly, a remarkable state of affairs.

Remarkable, because we are a nation of mechanics. The American mind is an inquiring mind. Our national habit is to make things move and keep them moving. We have a natural, inborn aptitude for machinery. Our locomotives, our automobiles, our electrical devices, our printing presses, and the wondrous inventions that have annihilated space, reduced unlimited power and speed to the whim of a child's hand are proof enough of our mathematical and creative bent.

Yet a hundred million watches, wondrous in their simple yet delicately adjusted mechanism, pulsate their 18,000 beats per hour in our pockets, or upon our wrists, and we never stop to inquire why, or remember how marvelous the untiring work of this little machine—work which, if computed by

[6]

The Riverside
The most dependable
moderate price
watch in the world



measurements or considered by performance, would startle us out of our indifference or apathy.

Our mental isolation from watch knowledge is strange when we consider the simplicity of the "works" of a watch. It is the one machine from which parts have been eliminated to the irreducible minimum.

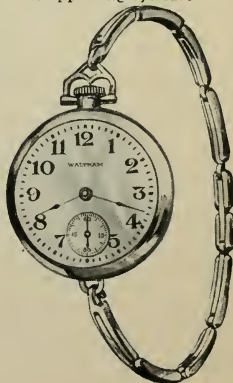
There is a well-defined paradox that the simplest things are the most complex, and the most complex the simplest. Indeed, a blade of grass holds the secret of Nature's subtlest operations, yet defines them in the simplest terms.

This is most true of the watch. It embodies the fulcrum, the lever, the spring, the gear, the bearing, the axle, the wheel, the screw, the shaft—and several natural laws such as gravitation, inertia, temperature—all harmonized in a beautiful organization of the utmost delicacy and simplicity, the chief functions of which are extremes of accuracy and long life.

Then again, a watch is an investment. We buy it upon faith, but its purchase is an event. What boy or girl does not look forward to the possession of his or her first timepiece? How proud we were when we got it, our very own! How we listened to its ticking and marked the hour of day a hundred unnecessary times for the sheer joy of looking at its smiling face! How we pitied the boys and girls who were not so fortunate!

Then, in later years, we bought or had presented to us a better or more costly watch. We slowly discovered its utility as Time grew more valuable with

Waltham
Jewel Series
With detachable
bracelet and patented
disappearing eye case



advancing years. Verily, a watch is the universal gift, the universal possession, and the man or woman who does not own one is poor indeed.

But suppose you knew enough about the “works” of a watch so that you could go to your jeweler with a well-defined knowledge of what watch you wanted, and why you desired that particular watch. Would not that be a valuable protection of the money invested and an insurance of pleasure in carrying a watch that you were familiar with and knew to be as nearly perfect in material and workmanship, and as good a watch as your money could buy anywhere in the world?

There is no valid reason why you should not have this knowledge; why you should not buy a watch with the same assurance that you buy your clothes, your house, your automobile.

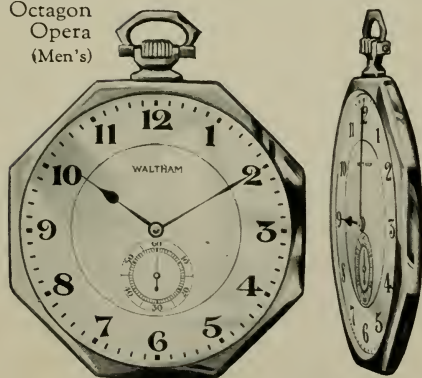
We buy everything by comparison except a watch. We *know* values by comparing, and we learn of quality by experience. If, then, we could have the “mystery” taken out of the works of a watch and its principal parts—the parts which insure its time-keeping and long life—laid bare to us, explained simply and convincingly—that would be valuable knowledge because there has been more disappoint-

ment, more chagrin at wasting money in buying inferior watches than any other article sold.

Let us remember first that it is not the “case” of a watch

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Waltham
Octagon
Opera
(Men's)



which keeps time. Thousands of inferior European watches have been dressed in attractive outside clothes and bought upon faith or an idea that the European watch was the "best" watch. Therefore, care should always be exercised when purchasing your watch to see that the case is substantial enough to give proper housing protection to the movement.

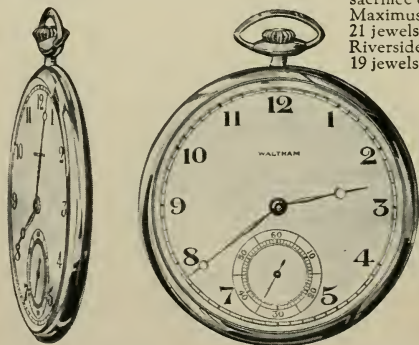
Countless men and women can testify that they made a mistake when they bought their watch upon "looks." True, a watch must have beauty, but beauty that does not go deeper than the gold or silver case is not real beauty. It is but skin deep, as the apt saying puts it, and we soon discover our mistake.

It might be well for us to inquire why so many people imagine the European watch to be the best watch. We all know that when an idea takes hold of the public mind it is very difficult to displace it. But when we ask ourselves *why* we believe in this prevalent idea—upon what knowledge, or proof, we believe it—we suddenly discover that we haven't any data: that, after all, it is mere hearsay.

Indeed, we might have had—or, at least, have known other people who have had—costly experiences related to buying or owning a European watch.

A century ago all the world's watches were made in Europe—chiefly in Switzerland. Then they were very costly and only the rich could afford to own

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Waltham
Colonial A
Extremely thin at no
sacrifice of accuracy
Maximus movement
21 jewels
Riverside movement
19 jewels.

them. They were made by hand in small quantities just as they are to-day, with this difference—the making of watches over there is now the chief employment of scores of thousands of people, many of whom farm in the summer and make particular parts laboriously by hand in the long winter months, then sell these parts to the watch assembly plants where they are put together into movements and shipped over here to be sold to the American public.

It will presently be seen why these assembled watch movements cannot possibly compare with a watch made under one roof, of standardized parts and of uniform material and design.

The European method of watchmaking is chiefly that of hand labor. Even children make certain parts, and it is a common sight to see a whole family busily engaged in making one unit of a watch—a kind of piece-work arrangement, just as a suit manufacturer here will send out bundles of coats and trousers to many people who stitch seams, make buttonholes or sew on buttons.

It is well known that steel and brass, the principal metals employed in making the “works” of a watch, are apt to be of variable temper and hardness. The product of one manufacturer differs in these essentials from that of another.

We shall talk of this later. But for the moment try to imagine the metallurgical discord in the “works” of, we will say, a series of European

[10]

Waltham
Colonial Series
15 to 23 jewels



watches, where the mainsprings, the hairsprings, the train and balance wheels are made from the varying metals of several manufacturers, especially when we consider that metal contracts and expands under different temperatures. It is a scientific impossibility for such a watch to keep time or stay in order — its life is mostly spent upon the repair bench.

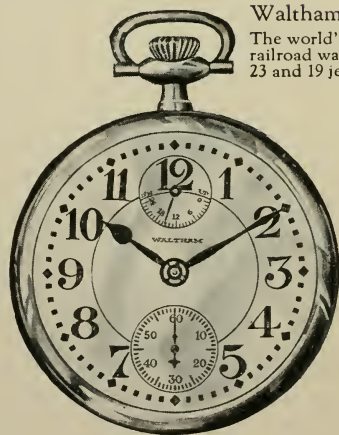
Add to this conglomeration of metal the divergent hand work which whips it into the desired shape for the particular part required, and we get some idea of what is meant when we say, "the European watch is made under a hundred roofs and when assembled is of unknown quantity in performance."

In fact, it is an article of speculation to the eventual buyer; it may keep time, but the chances are that it will give very poor service and soon be discarded. Its repair, too, is difficult, because it was made 4,000 miles away, and to obtain the correct part to replace the damaged one is often extremely difficult.

Let us now endeavor to answer this question. Is there a watch that truly creates a standard of quality by which we can instruct our mind, protect our pocketbook and use as a comparison to insure our making no mistake when individually we face the eventful question, "What watch shall I buy?"

We are now going to demonstrate to you that the Waltham watch is "The World's Watch Over Time." By that we mean that this watch enshrines

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Waltham Vanguard
The world's finest
railroad watch
23 and 19 jewels



Waltham Cadet
(For Men)

A strap watch with gold
covered back

such improvements in material and construction, such exactitude in manufacture, such precision in time-keeping, such "year in and year out" dependability in wear, such simplicity by the elimination of unnecessary parts, and such sturdy beauty of appearance that it is, in deed and in truth, a standard of watch-making that has not been excelled in all the world or in the history of horological science.

For over 65 years American mechanical genius at its highest development has been producing the Waltham watch. In this evolutionary process astounding improvements have been made, many revolutionary inventions introduced, and automatic machinery created of such marvelous performance that to see these machines at work is to pay tribute to the mental and creative power of man.

It is a fact beyond dispute — a fact that has amazed Swiss horologists who have seen them perform their daily miracles, that these machines by their precise and uniform operations, not only provide watches of excelling quality, but the parts they make are interchangeable for the numbered series of their particular watch.

The dealer is, therefore, enabled to carry in stock or obtain at immediate notice, a supply of parts for any movement whatever the date of its manufacture. Thus, the Waltham watch truly represents simplicity and economy of production, exactness, durability, together with convenience for every owner at a minimum of repair expense.

[12]

Waltham 7½ Ligne
The movement is actually
smaller than a dime
in diameter

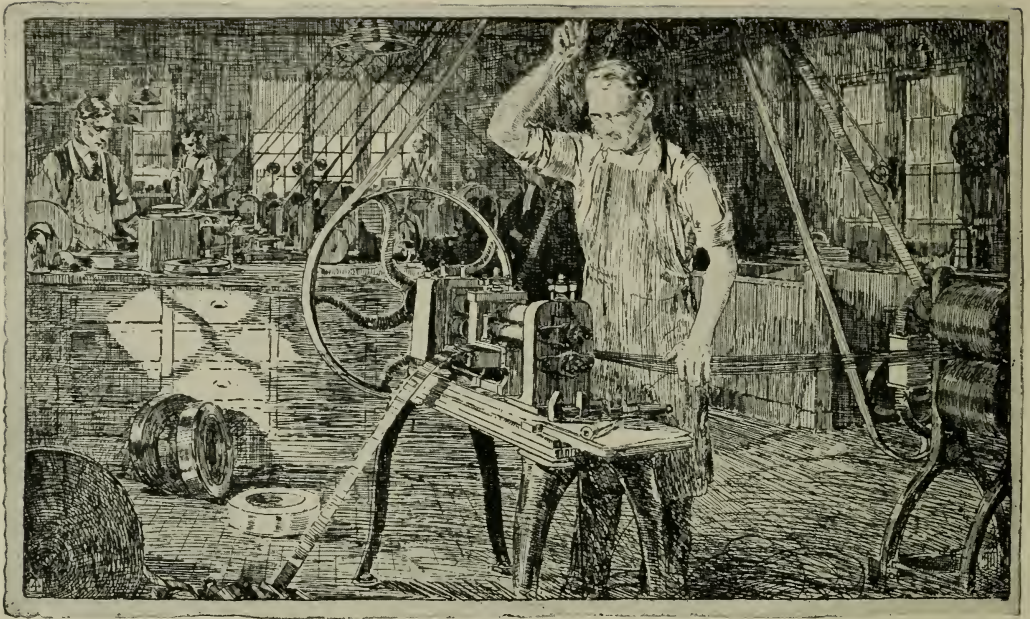


It will be interesting to investigate in what particulars the Waltham watch excels the European watch, and why this American masterpiece of time-keeping mechanism is called "The World's Watch Over Time."

As no watch is better than its "works" we will take the principal parts of a Waltham watch and match them one by one with the corresponding parts of the European watch, and reveal why and wherein the Waltham watch sustains its claims to world leadership.



Waltham 10 Ligne
(Silk Ribbon Wristlet)



THE
MAIN
SPRING



THE mainspring is the motive power of the watch. The Waltham mainspring is made of a piece of specially hardened and tempered steel, about twenty inches long, coiled in a barrel between the upper and lower plates of the movement.

The Main Spring

It is matched in degree of strength, width and thickness most suitable for the watch for which it is intended. As it is subjected to differing conditions of temperature and tension the variation in thickness of two one-thousandths of an inch, or lack of uniformity in hardening and tempering, will decide the time-keeping qualities of your watch.

Mainspring production involves problems so profound and methods so advanced that few, if any, watchmakers here or abroad even attempt it. The Waltham Watch Company produces fourteen tons of mainsprings every year. It is the largest mainspring maker in the world.

It is readily presumed that world leadership in production must necessarily imply superiority of manufacture. Costly experiments covering many years, the use of machinery and processes elsewhere unknown, are unanswerable reasons for Waltham superiority—a superiority which the Waltham watch upon skilled examination can sustain.

The Waltham mainspring is cut from long rolls of steel of uniform and special quality, then tempered in *resilient form*, by a secret process, and placed in

the watch coiled into a hardened and tempered steel barrel. This process originated at Waltham. If the spring should break its tension, discharge is confined within this barrel and no harm whatsoever can be done to the mechanism of the watch. This exclusive practice is a Waltham standard.

By comparing the Waltham mainspring with its European namesake, we shall discover wherein Waltham excels. Instead of being cut from long rolls of special uniform steel, the European mainspring is cut in *short lengths*. Instead of being hardened and tempered in its *resilient form* it is hardened and tempered in *short lengths*.

In other words, the European mainspring is bought in the open market and is necessarily an individual spring of uncertain temper, making the watch a speculation and a certain liability.

And that is one reason why the European watch usually gives such varying service.

In this connection let us remember that an inferior mainspring means an inferior watch, no matter how much you pay for it. The uniform superiority of the Waltham mainspring, its careful manufacture, the vast experience behind and in its development assure us that this watch is a safe watch, a dependable watch in respect to its motive power.

The National Physical Laboratory,
KEW OBSERVATORY,
RICHMOND, SURREY.

RATING DEPARTMENT.

I hereby Certify

That a CLASS A KEW CERTIFICATE

has been issued to *The Waltham Watch Co.*

Waltham: Mass:-

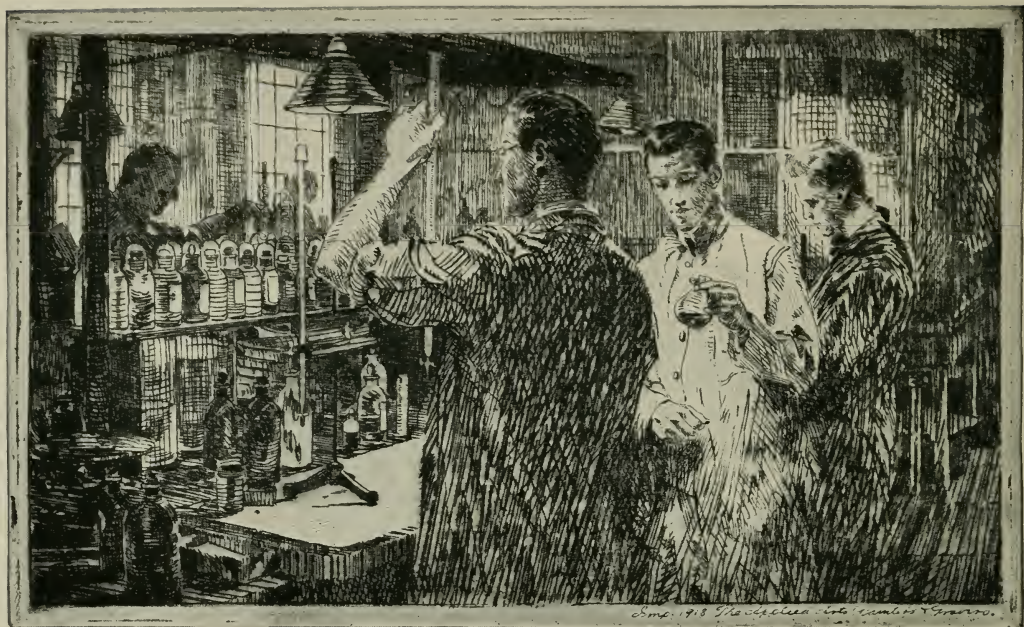
for the *Keyless crystal "Premier Maximus"* Watch

N^o 17000155, which was submitted to a Trial at this Institution
extending over 45 days from *March 8* to *April 21* 1912,

and the results of its performance were such as to entitle it to this
Certificate, in accordance with the Regulations for the issue of
Watch-rate Certificates approved by the National Physical Laboratory
Committee of the Royal Society.

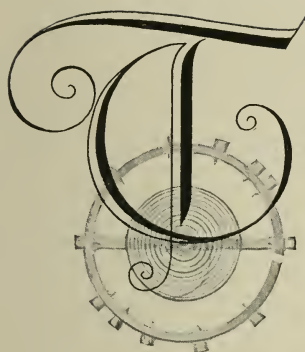
T. J. S.
DIRECTOR.

Reproduction of the famous Kew "A" Certificate
Waltham Watches have won many of these highly prized honors



THE
HAIRSPRING

The Hairspring



THE mainspring is the motive power of a watch — its heart and life — and the hairspring is its brain. The hairspring is the most delicate tension spring made. It is a piece of flat wire about twelve inches long, one hundredth of an inch wide, two and one-half thousandths of an inch thick, and weighs about one nine-thousandth of a pound.

For use in the Waltham 7½ Ligne Ladies' Watch (smaller than a dime in diameter), 84,000 of these springs are made from one pound of steel, raising the value of that pound of steel from \$5.00 to \$30,000.

The hairspring controls the action of the balance wheel, and its function will presently be explained.

The Waltham hairspring steel is drawn through diamond surfaces, and for the small watch mentioned to a third of the thickness of a human hair.

There are two kinds or forms of hairsprings, — the flat and the Breguet.

The Breguet, or overcoil (named from its inventor, a famous old French watchmaker), is used on every Waltham watch. The most important part of the complete operation in making a hairspring is the forming and tempering of this Breguet overcoil.

At Waltham, instead of being formed or bent by hand as a *separate operation*, the entire *completed* hairspring is *formed at one and the same time*, after which it is hardened and tempered *in form*, — the inven-

tion of John Logan, American watchmaker, a genius who was a part of Waltham leadership in watchmaking. Indeed, Waltham is the only watchmaker claiming this perfect method of making the Breguet hairspring. Such springs are not to be found in any other watches in the world.

By this perfected method the overcoil possesses the same degree of elasticity as the other coils, and is free from the weakness likely to result from being bent into shape after the steel is tempered.

This advantage of the Waltham spring will be appreciated when one considers that the hairspring contracts and expands four hundred and thirty-two thousand times every day the watch is running.

We will compare this Waltham triumph with its counterpart in the European watch. The European hairspring is first formed *in the flat*, then hardened and tempered *in the flat*. Then the outer coil is bent to form the Breguet overcoil, which, if the flat spring were *as hard as the Waltham* and *properly* tempered like the Waltham hairspring, it could not be bent to *correct* form, and would be liable to break in the attempt.

Thus, we perceive that the Waltham hairspring differs from hairsprings of European make in essential particulars. Waltham excels in original method, in exclusive and secret process, imparting to every Waltham watch in this tremendously important unit a superior functioning ability that insures dependable time-keeping throughout a long lifetime of wear.

San Antonio, Tex., Feb. 6, 1919.

Waltham Watch Company,
Waltham, Mass.

Gentlemen: I wish to thank you for your recent favor telling me the age of my father's watch. I have since come to Waltham for time and have bought a twenty-one jewel Vanguard. I must say that I am delighted with its remarkable time-keeping qualities. With a watch like this in one's pocket it gives a feeling of knowing positively that it shows the correct time.

Respectfully yours,

(Signed) G. A. Duerler, Jr.

121st Field Artillery, 57th Brigade,
32d Division, A. E. F.,
France, Mar. 21, 1919.

Waltham Watch Company,
Waltham, Mass., U. S. A.

Gentlemen: To-night, over here in France, I picked up an American magazine to read, and one of your advertisements for Waltham watches caught my eye.

I immediately sat down to write you a letter out of gratitude to you for making such a wonderful timepiece as the Waltham watch.

I shall give you a brief history of a Waltham 17 jewel Riverside wrist watch which I have.

I was given this watch in November, 1917, by my mother, as a gift. I have worn it ever since, night and day, except when taking a bath. When I came overseas in the summer of 1918 I had with me three watches, — the Riverside Waltham, and two watches of different makes. I judged that with all three of them, each a very fine watch, I ought to be able to have the correct time when the "zero" hour approached.

I was told that a wrist watch was not dependable and to rely on my pocket watch. I did this for some time, and often took the average readings, to the second, to get the correct time. I soon learned that my "best bet" was to take the time from the little Waltham on my left wrist. I have wound it, sometimes regularly, sometimes not, but always it is right.

This little watch has been rained on for hours at a time, dropped accidentally, jarred, and in fact has had nearly everything happen to it except being actually smashed. But any night I can check it almost to a second as being correct by the time as wireless from the Eiffel Tower, Paris.

It has varied some in a month's time. Fifteen seconds one month, twelve another. Never any more than that. My other watches ran into the minutes in their variations.

And to give an idea of the wear and tear it has gone through, I'll say that I have had a new strap fitted to it five times since November, 1917.

Because of its continued dependable service I thank you, and remain,

Yours very truly,

(Signed) Charles M. Burgess, 1st Lieut.

Visalia, Calif., Apr. 29, 1919.

Waltham Watch Company,
Waltham, Mass.

Gentlemen: Is your motto "One watch to one man in a lifetime"?

Since June, 1892, I have been carrying a Waltham watch which, with the exception of a broken crystal or so, has never been in a jeweler's store or elsewhere for repairs. It has been dropped on cement sidewalks, has reposed on the bottom of a lake in Canada, has never been cleaned, has been generally abused; still it ticks merrily on.

It has marked the hour of arrival of new-born babes and ticked the failing pulse of the dying, but nothing seems to disturb it, and it has gone constantly for twenty-seven years.

I thought this a rather remarkable record for a watch which at best was an inexpensive, plain or garden variety of timepiece.

And I thought you might be interested.

I have several times been tempted to secure a modern watch, but I am sure old faithful will go on forever and nothing will ever happen to stop it, possibly some one of the next two or three generations will wear it out.

Respectfully yours,

(Signed) Gilbert B. Furness, M.D.

Gardnerville, Nev.

Waltham Watch Company.

Gentlemen: I have a Waltham Watch, Case No. 123477, Works No. 3054697.

This watch has been in constant use for thirty years and is an A No. 1 timepiece, and is on the job every day. It has been subject to all kinds of conditions.

Are there any better records?

Yours truly,

(Signed) A. G. Werner.

Law Offices of Mason & Dyer,
Suite 408, Youngerman Building,
Des Moines, Ia., June 4, 1918.

Waltham Watch Company,
Waltham, Mass.

Sirs: In June, 1876, I purchased in Chicago at auction, paying \$55.00 therefor, one of your watches in an engine turned hunting case, solid gold, Waltham grade, works marked "Waltham No. 762577, Foggs Pat." Case No. 67660.

It was never cleaned or repaired but by one man until last year, when he going out of business another cleaned it.

I have carried it ever since, always reliable, and is now keeping almost perfect time. Varies maybe 15 or 20 seconds per month.

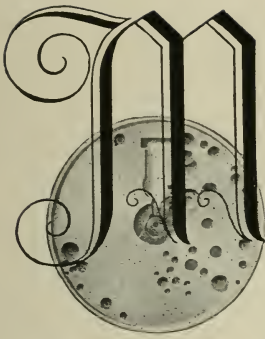
I think it is a remarkable watch and that, perhaps, you would like to know of it.

Yours truly,

(Signed) E. R. Mason.



THE
LOWER
PLATE



MECHANICALLY defined, a watch is a machine (containing not far from 150 parts) whose sole end is to "keep moving," and that watch is best as a timepiece the motion of which approaches most nearly to absolute uniformity.

If you open your watch and examine its mechanism, you will find it consists substantially of two supporting plates, between which is mounted a gearing of meshed wheels to take care of the movement recording time. These wheels are called the train, which we will examine later.

The lower supporting plate in a Waltham watch is the foundation upon which every unit revolves and is permanently fixed. This plate is bored with minute holes to take the pivots, screws and pinions of the reciprocal parts which form the movement proper.

During the 69 years of watch development at Waltham many illustrious names have been added to the history of horological achievement,—men whose genius for invention, whose supreme skill in making concrete their vision, have produced marvelous machinery that has revolutionized the art of watch-making.

One of these master minds was Duane H. Church, who, among other equally wonderful machines, invented one that drills, threads and finishes the lower plate of the Waltham watch.

This machine accomplishes many operations with such methodically exact, automatic continuity that one instinctively imagines a superhuman brain is hidden in the multifold action controlling its extraordinary work.

It makes every operation (and there are 141) with infinitesimal exactness, to the fraction of a human hair; flawless, beautiful in complete simplicity—every plate a replica of every other plate, an indisputable proof that Waltham standardization gives a uniform standard of highest quality to every owner or purchaser of a Waltham watch.

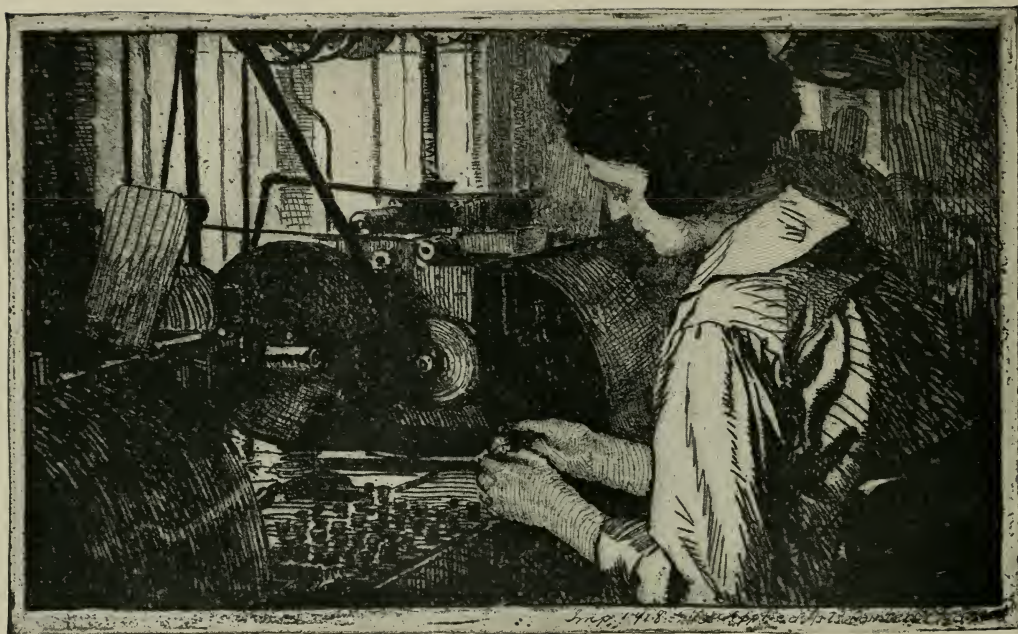
To test the truth of this we have only to compare the Waltham plate with that of the European watch. We shall find this latter made by hand and subject to all the variations which this hand process entails.

And the European made plate is constructed of various sizes and models without precise relation to the parts which they are to contain. Parts which, as we have stated, are made elsewhere in many homes and small shops, by hand.

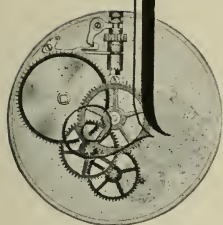
Over against the European method of assembling and the unknown and untried temper and quality of these units brought together by the watch manufacturers haphazardly is the Waltham method which produces a watch that is made complete in all its grades under one roof. And no hand work could ever approximate the beautiful and flawless exactitude of these Waltham machines that drill and thread with unerring precision.

Some of the prize medals awarded to the Waltham Watch at the world's greatest expositions





THE
TRAIN



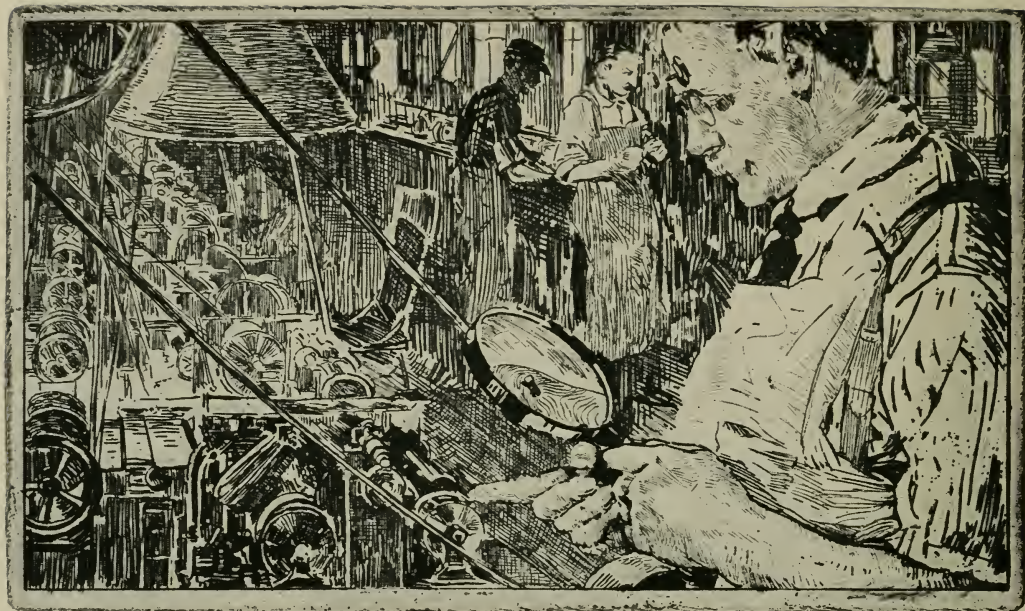
It is well known that power cannot be transmitted or divided into units except by gearing. Every automobile owner knows that the energy of his car's motor is passed on to the rear axle by a system of gears. When you wind your watch you store motive power in the mainspring which is transferred to the escape-wheel pinion by the time train, which is the horological system of gearing.

You will note by the illustration that for economy of space, and symmetry in form of covering, this train of gears is arranged as compactly as possible in a curved line, and ordinarily so disposed that the second wheel of the train is located in the center of the movement.

This time train consists of four wheels and pinions. The center wheel is directly connected through the cannon pinion (so-called because it is shaped like a cannon) with the wheels controlling the hour and minute hands.

Open a Waltham watch and carefully examine this train. Note the beautiful finish of these wheels, the uniformity of workmanship, and the truly marvelous cutting of the gear teeth which encircle them.

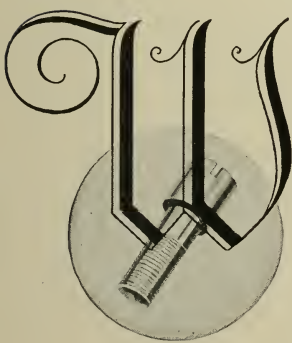
It is machine work as exact in its flawless creation as the cutting of a precious stone — a tribute to those geniuses who invented the exclusive Waltham machines that outwit the cunning of the human hand a thousand-fold; for what human hand could cut



THE
SMALLEST
SCREW IN
THE WORLD

these delicate wheels and pinions to this fraction of a human hair—wheels mechanically perfect, interchangeable for the serial watches for which they are made, standardized in material and infinitesimal exactness? Above all, free from the vagaries of a product made by various human hands.

Again, we discover Waltham superiority over the European watch in a most vital particular. In place of the European time train made by the old hand process with its variableness of workmanship, its unknown quality of material, its non-interchangeability, we can, each and every one of us, possess a watch where these important parts of its movement are in themselves guarantees of long life, dependability and time-keeping performance.



WHEN speaking of a machine we immediately associate the word with some application of power or bigness. We seldom think of the work of machinery as anything minute or delicate.

We are naturally thrilled standing beside a giant locomotive or watching the operation of a steam hammer whose blow is measured in tons.

But what say you of a machine the “turning” operations of which are so delicate, so minutely accurate, so amazing in precision, that it makes thousand after thousand of screws so small that the naked eye sees them as points of metal shining under reflected light

*The
Smallest
Screw in
the World*

— screws that measure 254 threads to the inch, and you can put 47,000 of them in a small thimble!

Impossible, you say? But when you look at one of these screws through a powerful magnifying glass, your admiration for Waltham machinery is a worthy compliment to work so remarkable.

You see a screw, hardened and tempered, its top polished to a cold brilliance. You notice that it is perfect in sphericity, absolutely uniform in thread and when you see the skilled watchmaker place this infinitesimal piece of machine workmanship in correct placement for its duty in that Waltham Ladies' Watch movement which is actually smaller than a dime in diameter, you vow that never again will you allow any one to say that the European-made watch is comparable to the American-made Waltham, which truly expresses American genius for making the impossible become possible, and for leading the world in performing miracles with machines that the human hands cannot possibly equal.

Just to compare the European, hand-made screw with this Waltham masterpiece is to know what Waltham standardization means. The difference is immediately noticeable. The one varies in size and is crude in workmanship. The other is uniform, perfect and an exact replica of the thousands that are made like it, which insures a Waltham standard of time-keeping performance wherever a Waltham ticks upon the wrist or in the pocket.

The Western Union Telegraph Company,
Manager's Office,

No. 26 Beaver Street,
New York, Dec. 6, 1918.

Waltham Watch Company,
Waltham, Mass.

Gentlemen: I think you may be interested in a watch I have carried for about twenty years. It is an open-faced gold watch, the movement is stamped A. W. W. Co., Waltham, Mass., 15 jewels, No. 8617766.

This watch has never stopped except on one or two occasions, when I permitted it to run down. The crystal has never been broken, although I am not a particularly careful man. Of course the original mainspring is still doing its duty.

The works have never been oiled since it was purchased. The watch has always kept time within five or ten seconds a day, and is apparently as useful a timepiece to-day as it was twenty years ago.

My friends agree with me that this is an extraordinary record.

Yours respectfully,
(Signed) A. S. Driver,
Manager.

Bend, Ore., Jan. 28, 1918.

Waltham Watch Company,
Waltham, Mass.

Gentlemen: My father is the proud possessor of a Waltham watch which he has carried for forty-one years. It was lost overboard off a steamer in the Grand River, Michigan, the first year that he had it. Next morning a stoker dove and recovered it, and it was running as merrily as though nothing had happened.

Dad declares that it is the only time it was ever "in soak."

It was cleaned twenty-six years ago; and two years ago he had to have a new mainspring put in to replace a broken one.

That is all the expense it has ever been to him. It keeps perfect time to-day.

Would you be so kind as to tell me when it was made?

It is a P. S. Bartlett model No. 1698427, case No. 303413. The original case is still on it, but is worn quite thin.

Thanking you, I am,
Yours respectfully,
(Signed) N. A. Cobb.

Brooklyn, Oct. 21, 1869.

Messrs. Howard & Co.,
New York.

Gentlemen: I am happy to make you a good report of the Waltham watch that I procured of you. It has far exceeded my expectations and leaves me nothing to be desired. I have had it

about five months, and during that time it has been running by the side of a superlative English watch (which one of the first chronologers pronounces "the finest watch that ever came to New York") and the Waltham watch has run more steadily, evenly and accurately than its foregoing competitor.

I cannot conceive that a better watch can be made, and I am proud of it as a specimen of American skill and industry.

(Signed) Henry Ward Beecher.

North Augusta, S. C., May 13, 1919.

The Waltham Watch Company,
Waltham, Mass.

Gentlemen: This is a letter of appreciation for service rendered by a Waltham watch.

Three years ago I bought from Wm. Schweigert & Co. of Augusta, Ga., a small seven jewel Waltham. This watch withstood all manner of hardship when I was connected with the Wiring Department of Westinghouse, E. & M. Co., at East Pittsburgh, Pa. From the Westinghouse I went to France as a private in 37th Engineers. There never was a day or night at Chateau Thierry or the Argonne Woods that my little watch was not on duty every minute of the time.

Sometimes for weeks we fellows never pulled off our clothes day or night. I have slept on tile floors with my watch in pocket next to floor, and while the back of watch is pretty badly dented it keeps correct time to-day and it has never seen a repair shop since I wound it up in June, 1916.

You may use this letter as you like.

Yours very truly,
(Signed) S. B. Townes.

1102 Grove Street,
Evanston, Ill., Mar. 13, 1919.

Waltham Watch Company,
Waltham, Mass.

Gentlemen: Reading with interest your advertisement in the "Red Book," I journeyed back in memory to Christmas, 1878. On that date my father, Mr. Stephen Greene (of the printing company in Philadelphia bearing his name), gave me a Waltham watch.

I used it constantly until 1916, when as a matter of sentiment I had the gold case cut down to fit works of wrist-watch size as a graduation gift for my daughter when she completed her college course.

The works are still so fine (the watch was a champion timekeeper always) that I had them set in an open-face case for my husband, who carried this watch in preference to any other.

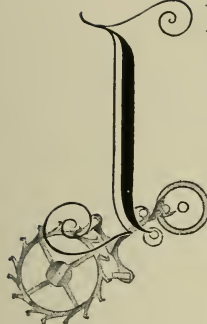
I thought this little bit of history might be of interest to you.

Yours very truly,
(Signed) Anna G. Hill.
(Mrs. Howard Z. Hill.)



THE
ESCAPEMENT

The Escapement

N considering the more complex portions of the watch mechanism we can but briefly touch upon the salient points of instructional interest — to explain the details of construction and action fully is impossible in this booklet.

The escapement is a very vital part of the watch organism. It is the heart of the watch. Just as the heart pumps the blood through the human body to maintain life and energy, so the escapement controls the power generated by the mainspring and transfers it into elements of time.

The Waltham watch escapement controls the power transmitted from the mainspring through the train wheels to the balance wheel, which, in turn, divides the motion into intervals of time, pulsating 18,000 beats per hour — and this pulse beat is recorded on the dial by the hands.

The escapement consists of the escape wheel, two pallet stones set in the pallet, and a fork, a roller and a roller jewel. The purpose of the pallet and two pallet stones is to stop and release the escape wheel at the end of the train, at equal time intervals of about one-fifth of a second.

The Waltham escape wheel has exclusive features. For instance, the most important part of the escape wheel is the impulse surface. In the Waltham watch this impulse surface is trued by a diamond cutting tool, which not only cuts it to absolute exactness,



THE
MATCHER

but gives the high polish required by the Waltham standard of quality at the same time.

When we make comparisons we discover that in the European watch the impulse surface of the escape wheel is polished with a compound, by hand, which invariably charges the surface with cutting pigments that practically defeat the vital reason for polishing, and is, therefore, detrimental to the component mechanism.



THE escapement action depends upon three very important jewels. In describing the escapement we mentioned the two pallet stones and the roller jewel. These jewels are exquisite little pieces of polished faceted ruby or sapphire, and extraordinary accuracy is demanded in their dimensions and high polish to insure the accurate time-keeping and durability of the watch.

*The
Matcher*

For instance, the impulse face of the Waltham pallet jewels are not only highly polished, but absolutely flat upon their engaging surface. The corresponding engaging surface upon the escape wheel is circular, and therefore must be in harmonious relation to the impulse angle of the pallet jewels.

This exclusive Waltham practice is not found in any other watch in the world.

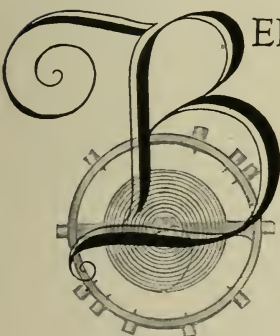
Another Waltham distinction is the Waltham double roller escapement construction. The roller



THE
HAIRSPRING
AND
BALANCE

jewel is a beautiful piece of horological art. It is finely tapered and driven into its bearing under high pressure.

Ask your jeweler to show you these interesting distinctive parts of a Waltham watch. You will find them instructive in what they reveal of beautiful and original workmanship — those refinements of knowledge and skill which have made the Waltham watch such an accurate and dependable timepiece all over the world.



BEFORE we pass on to the construction and function of the balance wheel, we will explain the “mating” or harmonizing of the hairspring upon the balance wheel.

Just as a pendulum swings so far to left or right, and is stopped and swung back to the point of impulse by gravity, in like manner a hairspring retards the balance wheel of a watch and revolves it back to the point of impulse, which impulse is given by the escapement.

Therefore, as the hairspring controls the speed and arc of vibration of the balance, or its resultant, time, it is of the utmost importance to the time-keeping quality of the movement that the balance and hairspring be mated in perfect ratio as to the weight of the balance and the strength of the spring.

To determine this absolute ratio, John Logan, a famous Waltham horologist, to whom we have al-

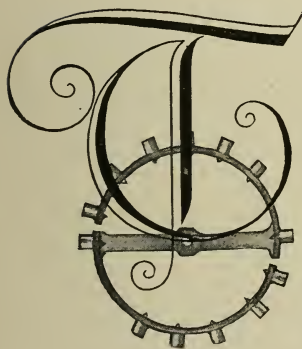
The Hairspring and Balance



THE
BALANCE

ready referred, invented a vibration machine which so accurately mates the Waltham balance wheel and the hairspring, so perfectly selects the right hairspring for the particular balance wheel, that when finally assembled in the watch, the watch is a natural time-keeper.

This is one reason why the Waltham watch is famous for its close and constant time rate.



THE varying conditions to which a watch is subject make demands upon it which are unequaled in any other known form of mechanism. And when we thoughtfully consider even the ordinary usage which a watch endures, we are astounded at its continuous performance of steadiness and uniformity.

The Balance

Your Waltham watch seems to ignore violent and sudden changes in position and that which more vitally affects the mechanism—extreme variations of temperature. There are many scientific inventions in the works of your watch to give it dependability and marvelous sturdiness, and none more interesting than the compensating balance.

It is a well-known law of nature that all metals expand or contract under the influence of heat or cold. As the hairspring presents so much surface in proportion to its total mass it is extremely sensitive to thermic influence. Its length increases as the temperature rises, and as the spring lengthens its power, of course, grows weaker.

Another natural law further influences the action of the spring, inasmuch as aside from the weakening of the spring due to expansion, the heating of the spring also reduces its elastic force.

The compensating balance is an invention which is so constructed that the same heat which weakens the elastic force of the hairspring serves at the same time to reduce the diameter of the balance, adapting it to the force which the weakened spring is capable of exerting. This property of automatic compensation is obtained by constructing the balance rim of two metals having widely different ratios of expansion.

These metals in the Waltham balance wheel are of specially treated steel and brass, fused together and rolled under high pressure to produce the necessary temper after fusing. In the making of this standardized Waltham balance wheel there are thirteen master stages and about six hundred detail operations.

The Waltham balance wheel responds to heat or cold more readily than the balance in the European watch, which is apt to be too soft and lacking in temper to keep perfect time or to be easily repaired.

The European watch balance wheel lacks the standardized uniformity in the fusing and rolling of the metals, so essential to the time-keeping qualities of the watch, and which can only be produced by the highly specialized and exclusive machinery developed at the Waltham shops.

We have given the reader but a glimpse of the "works" that are behind the creation of a Waltham watch movement. We have but casually referred to

machinery which creates a standard of accuracy unapproached elsewhere in all the world; machinery that is the product of American genius, of invention upon invention, improvement following improvement—the record of nearly three-quarters of a century to excel in watch construction and exact time-keeping performance.

We have also referred to the material excellence, the distinctive design and advanced process of manufacture which distinguish every part of a Waltham watch from the jewels to the mainspring, and it would, therefore, not be out of place to pay a just compliment to the master workmen developed at Waltham whose training and skill play no small part in Waltham success.

The Imperial Trans-Antarctic Expedition,
S.Y. *Aurora*, Mar. 16, 1917.

E. J. Hyams, Esq.

Dear Hyams: I have great pleasure in advising that the Waltham watch that I was using on the expedition with Sir Ernest Shackleton to the South Pole was invaluable. When the *Aurora* broke away in the ice pack, we were without any chronometers or other means of getting our location or position except by the Waltham that I possessed. To show the high quality that the Waltham watch must possess, I can give you the following facts:

One day I lent the watch to Mr. Wild, and by some means he overwound, or broke the spring, and the watch would only go for four hours, and then had to be rewound every four hours. You may guess that this required attention, so I had to wake up every four hours to wind my watch. Had the watch gone back on us, we don't know what we should have done, as I previously remarked it was the only timepiece among the party I was a member of. I need not tell you that if ever I go on another expedition to the South Pole, which I feel certain I shall after I have done my duty to the Empire and have the good fortune to come out, I shall always use a Waltham and nothing else. The best watch made is always good enough for me.

Kind regards,

(Signed) Ernest E. Joyce.

1671 10th Street,
San Diego, Calif., Jan. 25, 1919.

Waltham Watch Company,
Waltham, Mass.

Sirs: In 1895 I purchased watch No. 6619118, and have worn it constantly ever since that time in all parts of the world.

Have used it in lieu of a chronometer in navigation on several occasions, but I believe my latest experience with it shows its reliability more than anything I know of.

My ship, the *Benito Juarez*, foundered under my feet on Dec. 3, 1918, in the mid-Pacific, and I spent 30 hours in the water and in the lifeboat, riding out an 80-mile gale, until we landed on the island of Lanai, yet no water got into the watch to do it any damage.

When the wreck occurred I was pitched into the sea and had to swim about one-half hour before being picked up by the lifeboat, and during the remainder of the 30 hours we were drenched all the time with the heavy seas, but without affecting the watch at all.

Perhaps the absolute reliability of the watch, during all these years, would not have impressed me so had I paid several hundred dollars for it, but the fact is that I only paid \$25.00 for it in a 20-year gold-filled case.

Very truly yours,

(Signed) R. H. Anderson.

(First officer S.S. *Benito Juarez*.)



THE
MASTER
ASSEMBLER

The Master Assembler

AMONG these horological artists the work of the master assembler is very important. He is the man trained by long experience in Waltham standards of quality to instantly recognize the most insignificant technical error or flaw in material which might possibly intrude upon the correct time-keeping of the watch.

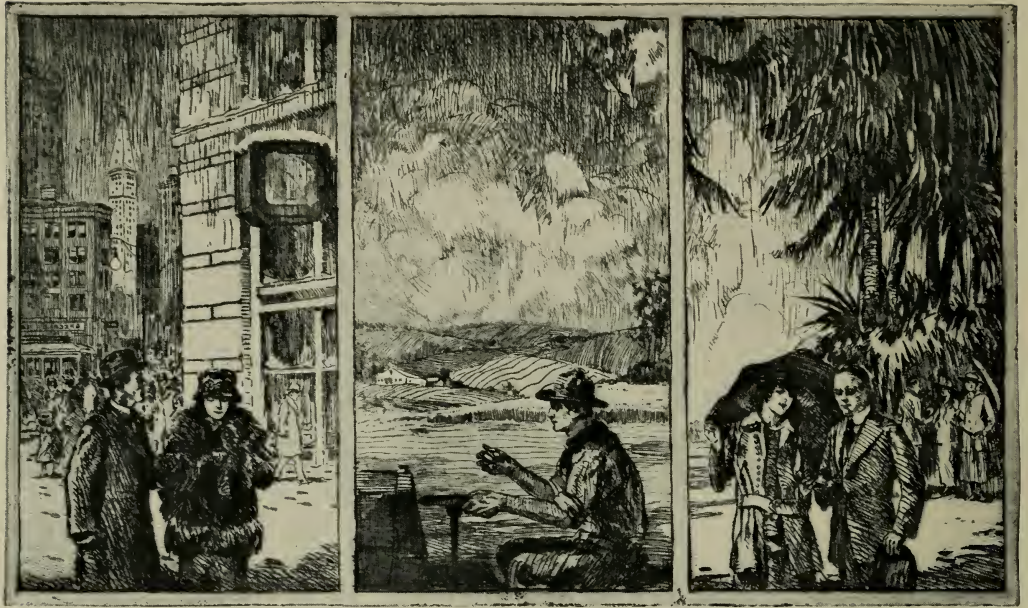


He is the assembler of the balance and hairspring which, as we have told you, are the heart and brain of the watch, and ultimately beat, upon your wrist or in your pocket, 432,000 pulsations a day, year in and year out (and yet we seldom think of those mechanical wonders hidden in a watch).

It will sharpen our appreciation to remember that there are hundreds of master workmen at Waltham doing one thing supremely well. Each and every one is a highly trained watchmaker—yet this team work is one of the big reasons why the Waltham watch has invariably defeated the world's best watches in open competition.

When we compare this team work with the isolated assembler of the European watch we readily perceive at what a disadvantage he is placed.

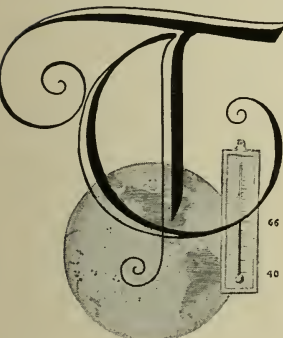
He is known as a “repasseur,” but his capacity is rather that of a judge. The material that comes for his inspection is of unknown quantity in accuracy of construction and finish. He must decide on the barest information and appearance, whether one part is good enough to equal or stabilize another part.



TIMING AND
ADJUSTING

This condition exists because the European watch is an assembled watch, and, as we have said, the parts are made in many shops and homes, with hand machines—no standardization, no ideal, and the buyer of a European watch incurs this liability.

Timing and Adjusting

 HERE is a final test which the Waltham adjusted watch must undergo before it goes into the world to perform its duty of keeping time. It must be tested not only for positions, but for temperature.

“ The five positional tests include face down, face up and in three different vertical positions. But the temperature test is perhaps the most interesting. It is one of the reasons why the Waltham watch gives such accurate time under varying climatic conditions. It has been carried by explorers all over the world and this is the reason for their enthusiastic indorsement.

The Waltham watch compensates to three temperatures. You can carry it from the arctic to the temperate zone, or to the tropics, and it will give a correct performance under these varying climatic conditions.

At Waltham, watches are kept running in extremes of temperature for stated periods at an average thermometer reading of 40, 66 and 92. The variation is then adjusted and the watch so timed that it can be carried around the world as a dependable companion.

The Waltham equipment necessary for these final adjustments is unexcelled in all the world. One could

Some of the prize
medals awarded
to the Waltham
Watch at the
world's greatest
expositions.



hardly imagine a use for a large, exclusive, refrigerating plant at Waltham, but that is what you see when you visit this important department. A "temperature" plant which tests your watch as it probably never will be tested by travel or change of residence.

Most European watches lack this completeness, this exacting inspection and adjustment. Indeed, they cannot meet the standard of excellence required by railroad specification at a given price, where the variation in time must not exceed 30 seconds a week when tested in temperature and position. That is why there are more Waltham watches used on the railroads of the world than all other watches *combined*.

The Waltham watch is probably the only watch in the world made and completed in one factory. Millions have been sold. You can buy Waltham watches from \$21.50 to \$500 and over in men's sizes, and from \$31.50 to \$1,000 and over in ladies' sizes—according to the case. Every watch that leaves the factory is numbered and is always related to that number; it does not matter where its destination.

HE Waltham Watch Company were the first to make every size and kind of watch in this country. It is the most copied, the most widely imitated watch in the world, as it is also the best known. It is easily repaired. It is standardized. It has won more honors at the world's great expositions than all other watches combined. It

Medals

Do Not Circulate

Some of the prize
medals awarded
to the Waltham
Watch at the
world's greatest
expositions.



has created a new standard of watch excellence. Many improvements and inventions that are now the horologist's common property were created in the Waltham laboratories.

It has upheld America's traditions for world leadership. It has been the choice of foreign railroad watch commissions as representing watchmaking and time-keeping at their highest development. The Waltham watch has not only placed America first in horological achievement, but is a universal reason why your watch selection should be a

WALTHAM
THE WORLD'S WATCH OVER TIME